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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/046,121 03/20/98 HALL

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EXAMINER

WM02/0525

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ART UNIT	PAPER NUMBER

2613

DATE MAILED:

05/25/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

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Office Action Summary

Application No.

09/046,121

Applicant(s)

HALL ET AL.

Examiner

Allen Wong

Art Unit

2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 12-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6,8,10,14,19,27,29 and 30 is/are allowed.
- 6) ☒ Claim(s) 1-5,7,9,12,13,15-18,20-26,28,31-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

DETAILED ACTION

Response to Arguments

Applicants' arguments filed 3/22/01 have been fully considered but they are not persuasive.

Rule 1.121 © (3) states that the absence of an accompanying marked up version constitutes an assertion that the claim has not been changed relative to the immediate prior version. However, after perusing the clean copy of the claims versus the marked up copy of the claims, slight discrepancies were noted (e.g. claim 14). Please correct these discrepancies.

On page 28, 3rd full paragraph of applicants' remarks, applicants contend that Uz does not teach the present invention. Applicants' disclose that determining when an image is being faded over a sequence of frames is entirely unrelated to when an image contains a noisy portion. The examiner respectfully disagrees. Fade is considered noise because fade has complexity. The Office broadly considers "noise" to be as motion, temporal changes, spatial changes or fade detection because all of these have some degree of complexity and picture detail. Now in the applicant's specification page 15, lines 12-16, the applicant defines noisy video as "picture or that portion of a picture as having very high complexity". According to column 3, lines 25-27, Uz points out that frame encoding (ie. intra-frame encoding) is typically preferred when the video scene contains "significant detail". Significant detail in any video frame is considered to be having "very high complexity" because if there were no detail, then there would be no complexity.

On page 29, 3rd full paragraph of applicants' remarks, applicants assert that Uz does not teach that intra-frame statistics was used for determining the noisy portion in a given frame. The examiner respectfully disagrees. In column 4, lines 34-37, Uz discloses that the complexity measure (intra-frame statistics) is taken from sections of a frame (ie. intra-frame encoding). Further, note Uz discloses, in column 4, lines 38-40, the bit budget for each section of a frame is allocated for each macroblock in each section of a frame. Clearly, Uz teaches using information within the current macroblock in obtaining values for the macroblock. Uz discloses using information from sections within the current macroblock in obtaining values for the macroblock. Evidently, Uz discloses the use of the intra-frame statistics for determining the picture's noisy portion (ie. complexity, activity, picture detail) since intra-frame encoding is used.

Similar arguments were presented in applicants' remarks on page 30-32, where additionally, applicants state that Flannaghan (4,703,358) is unrelated to the present invention. It is the examiner's contention that Flannaghan is used for determining noise and then finds ways for reducing noise. Flannaghan's reference is used to further reinforce the concepts of Uz's reference, where dynamic encoding is emphasized. Noise determination in video information well known in the art. As stated before in the above paragraphs, Uz does disclose the intra-frame encoding in col.3, lines 25-28 where Uz states "(Intra-) Frame encoding is typically preferred when the video scene contains significant detail." In column 4, lines 35-38, Uz discloses that a bit budget is allocated for each frame based on a complexity measure. Uz teaches the intra-frame

statistics, used to determine the bit budget for each frame, have been gathered and determined by the intra-frame encoding process.

Applicants' arguments on pages 33-36 regarding dependent claims 7, 9, 12, 13 and 26 see response to arguments in the above paragraphs. Applicants mention that claim 7 explains how to bias the prediction error of a noisy macroblock. This limitation is not disclosed in the claims. However, Uz's citation of motion estimation teaches that the macroblock is biased predictive coded based when the activity level is exceeded (col.11, lines 20-26). Claim 9 merely discloses the determination of adaptive quantization levels as cited in column 12, lines 50-53 of Uz. Claims 12 and 13 are related to concepts of determining noisy portion in video data and using intra-frame encoding to gather statistics. See the above paragraphs. For claim 26, applicants' state that obviousness for rejecting the claim has not been stated. As stated before in the previous Office Action, Uz teaches the determination of an activity level. But Uz may not appear to specifically use the term "comparison" of activity levels. But obviously to one of ordinary skilled in the art, Uz would have to compare of the minimum activity level of said order with a next to minimum activity level for achieving encoding efficiency, accuracy, and to keep up with today's video encoding standards.

In summary, Uz teaches concepts very similar to the applicants' invention. The present invention is related to MPEG video encoding standards, as stated on page 2, line 23 of applicants' specification. Uz discloses in abstract and column 1, lines 18-20 that his invention is related to MPEG video encoding standards. Both the applicants' Uz's use motion compensation and motion estimation. Both the applicants' and Uz use

the standard DCT, quantization, VLC processes. Uz teaches in column 4, lines 9-16 that standard DCT, quantization, VLC and motion estimation processes. On applicants' figure 1, the standard DCT, quantization, VLC motion estimation processes are used as well. So, Uz operates in the same video encoding environment as the present invention. Therefore, because of the reasons mentioned the above paragraphs and here, the rejection of claims 1-5, 7, 9, 12, 13, 15-18, 20-26, 28, 31-38 is maintained.

Claims 6, 8, 10, 14, 19, 27, 29 and 30 are allowed over the prior art.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 7, 9, 12, 13, 15-18, 20-26, 28 and 31-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uz (5,682,204) in view of Flannaghan (4,703,358).

Regarding claim 1, Uz discloses a method for encoding a frame, comprising:
using intra-frame statistics to determine without reference to another frame whether said frame includes a noisy portion (col.3, lines 25-27; note intra-frame encoding is used and note Uz discloses "significant detail" is determined in a video frame, thus statistics are gathered from the intra-frame encoding process), and if so, then for each macroblock of said frame:

(I) determining a macroblock activity level (col.8, lines 27-35; an activity level is

measured which is the same as the determination of an activity level);

(ii) determining when said macroblock activity level exceeds a predefined threshold (see figure 3; note that a threshold is set and a determination means must exist to determine when the activity threshold is passed so that a course of action will be taken due to the determination of whether the macroblock activity level exceeds a predefined threshold), wherein said macroblock activity level exceeding said predefined threshold indicates that said macroblock is associated with said noisy portion of said frame; and

(iii) adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock (see figure 3; note that if a threshold is exceeded, then intercoding is used which thereby reduces the bit-rate and conserve bits used in encoding said macroblock) and thereby save bits otherwise used to encode said noisy portion of said frame.

Although Uz may not appear to mention the limitation of "determining whether said frame includes a noisy portion, and if so, then for each macroblock of said frame", Flannaghan teaches the determination of noise in frames (col.3, lines 3-10; note that the erroneous frame difference value is the noisy portion of a frame, and of course, as any one of ordinary skilled would know that frames are comprised of macroblocks). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Uz and Flannaghan for noise reduction and adaptive encoding so as to provide accurate, efficient encoding schemes for producing high quality images.

Note claims 2, 3, 17, 24, 25, 31, 37 and 38 have similar corresponding elements.

As for claims 7 and 28, Uz discloses motion estimation process done on said macroblock (col.11, lines 20-26).

Regarding claims 9, 22-23 and 35-36, Uz discloses the determination of adjusted quantization level for use in encoding a macroblock (col.12, lines 50-53).

Regarding claims 4, 18 and 32, Uz discloses the comparison of "total activity of a frame macroblock" (col.5, lines 62-63). However, Uz fails to disclose the comparison of a minimum activity level of said order with a next to minimum activity level of said order to derive said activity level for said macroblock as disclosed by the applicant.

Therefore, it would have been obvious to one of ordinary skill in the art to compare the minimum activity level of said order with a next to minimum activity level of said order to derive said activity level for said macroblock for encoding accuracy and efficiency.

Regarding claim 5, Uz does disclose the calculation of average activity (col.11, lines 12-13) in frame macroblocks. However, Uz fails to teach the comparison of a minimum activity level with an average activity level in said multiple blocks of said macroblock. Therefore, one of ordinary skill in the art would obviously do a comparison of a minimum activity level with an average activity level in said multiple blocks of said macroblock for improving encoding accuracy and efficiency.

As for claims 12 and 13, Uz discloses a measure of a frame complexity value (col.12, lines 60-64). However, Uz fails to teach the calculation of a complexity threshold and the comparison of said frame complexity value. Therefore, it would have been obvious to one of ordinary skill in the art to calculate a complexity threshold from a

group of frames, since an activity threshold can be calculated, and a comparison of complexity values is obvious to do from a group of complexity values for improving encoding accuracy and speed.

As for claims 15, 16, 20 and 33, one of ordinary skilled in the art would obviously recognize that all digital devices require the flagging of ones and zeroes since digital logic dictates the well known use of a binary system in digital communications.

Regarding claim 26, Uz does teach the determination of an activity level (col.8, lines 27-35; the measure of an activity level is the determination of an activity level). However, Uz fails to disclose the comparison of a minimum activity level of said order with a next to minimum activity level of said order to derive said activity level for said macroblock as disclosed by the applicant. Therefore, it would have been obvious to one of ordinary skill in the art to compare the minimum activity level of said order with a next to minimum activity level of said order to derive said activity level for said macroblock for encoding accuracy and efficiency.

Note claims 21 and 34 have similar corresponding elements.

Allowable Subject Matter

Claims 6, 8, 10, 14, 19, 27, 29 and 30 are allowed over the prior art.

The following is a statement of reasons for the indication of allowable subject matter: the applicant incorporated the allowable subject matter into an independent form along with the intervening claim limitations. The combination of limitations in the independent claims 6, 8, 10, 14, 19, 27 and 29 were not taught in the prior art and are patentable.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Contact Information


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen Wong whose telephone number is (703) 306-5978. The examiner can normally be reached on Mondays to Thursdays from 8am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Kelley can be reached on (703) 305-4856. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-5359 for regular communications and (703) 308-6306 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

AW
May 23, 2001


CHRIS KELLEY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600